REMARKS

Reconsideration and allowance of this application are respectfully requested.

By this Amendment, claims 1, 2, 7-9, 11-20, 22-25, 29, 30, 33-42, 44, 45, 51-53, 55-58, and 66-70 have been amended.

Claims 59-65 were previously canceled.

New dependent claims 71-81 have been added.

Support for new claim 71, 74, 76, 78, and 80 can be found, *e.g.*, at ¶¶0032-0033.

Support for new claims 72-73, 75, 77, 79, and 81 can be found in the section titled "Chunking" on pg. 26, ¶0057. As explained, in some cases portions of an object (*e.g.*, only initial portions) are initially replicated (*e.g.,* "only the initial chunks of a object are replicated when a replication admission decision is made ....")

In addition, certain claims have been amended to clarify when an object is no longer popular, only some ("at least some part")of the object need by deleted. Support for these claims is found, *e.g.*, at ¶0057 ("The initial chunks of an object can be left in the storage even when the object becomes unpopular.")

The claims have been amended to clarify that the dynamic measure of popularity is compared to a *dynamic popularity threshold*. Support for these amendments is found in the application as filed, *e.g.*, at ¶¶0041 – 0044 ("... a fixed threshold does not capture this dynamic nature of popularity" *Id.* ¶0041; "...automatically adjust the replication threshold ..." *Id.* ¶0043).

The claims have also been amended throughout to recite that the conditional replication replicates <u>a portion</u> of the requested object.

No new matter has been added by these amendments.

Claims 1-3, 5-25, 27-47, 49-58, and 66-81 are pending in this application.

A.   THE 112 REJECTIONS
Rejections under 112, first paragraph

Claims 1, 23 and 45 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description and enablement requirements. Dependent claims 2-15, 66-70, 24-37, 46-58 are also rejected under 35 U.S.C. 112, first paragraph by virtue of their dependence on claims 1, 23, and 45.

The Examiner's concern was with the term "cache server" in the claims. Applicant believes that one of skill in the art would understand that the origin servers, edge servers, and parent servers are all cache servers. However, in order to expedite prosecution of this application, the term "cache server" in the claims has been changed to "server."

In view of the amendments to the claims, withdrawal of this rejection under Section 112, first paragraph, is respectfully requested.

Rejections under 112, 2nd paragraph

The Examiner rejected claims 16 and 38 under 35 U.S.C. §112, second paragraph, as being indefinite. Dependent claims 17-22, 39-44 are also rejected under 35 U.S.C. 112, second paragraph by virtue of their dependence on claims 16 and 38.

Claims 16 and 38 no longer recite the term "cache server." In claim 16, step (B) recites "the edge server site redirecting the client request to a parent server site in the network distinct from the edge server site." The claim also says that "the requested object is served to the client from a server site other than the particular edge server site." There is no requirement that the server site that actually serves the requested object be the same parent server site to which the edge server site directed the request. The claim only requires that the server site that actually serves the object for this request be "particular edge server site." Similar arguments apply to claim 38.

In view of the above, withdrawal of this rejection under Section 112, second paragraph, is respectfully requested.

B.   CLAIM REJECTIONS UNDER 35 U.S.C. §101

The Examiner rejected claims 23 and 38 under 35 U.S.C. §101. The Examiner also rejected dependent claims 24-37 and 39-44 under 35 U.S.C. §101 by virtue of their dependence on claims 23 and 38.

Claims 23 and 38 have been amended, as suggested by the Examiner, to software that is embodied on non-volatile computer-readable storage media.

As requested by the Examiner, Applicant also amended the specification on page 30, paragraph 66 (to delete the phrase "a carrier wave modulated, or otherwise manipulated, to convey instructions that can be read, demodulated/decoded and executed by a computer.").

In view of the above, withdrawal of this rejection under §101 is respectfully requested.

C.   THE PRIOR ART REJECTIONS

The Examiner rejected claims 1-3, 5-25, 27-47, 49-58, and 66-70 under 35 U.S.C. §103(a) as being unpatentable over Jungck (U.S. Pub. No. 2005/0021863 – hereinafter "**Jungck**") and Sim (U.S. Pub. No. 2003/0031176 – hereinafter "**Sim**").

The grounds for this rejection are respectfully requested.

Sim relates to replication of content on so-called "distribution stations." *Sim*, Abstract. In Sim, content is distributed throughout a computer network. ¶0044. Sim describes a system in which large files are broken into multiple portions. *Id.* ¶0047. These portions are replicated and distributed to a plurality of distribution stations (a.k.a. nodes) at the edge of the network. *Id.* One factor considered by Sim to decide what portion of content to save locally is "popularity." *Id.* ("Each distribution station is configured to determine how much

of the content to save locally, based on information such as usage, popularity, etc."
Id.) In Sim, different pieces of a file may be available from different nodes,
however, when a user requests access to the file a virtual file control system
creates an illusion that the entire file is present at the connected node. *Id.*

Claim 1 and its dependents have been amended to recite conditional or
selective replication of **a portion of** the requested object on a server site other than
the server site from which the requested object is ultimately served (for that
particular request). This **portion of the requested object** is "for use in serving
future client requests." (Claim 1). The decision as to whether to replicate **a
portion of an object** is based, at least in part, on a dynamic measure of the
object's popularity relative to a dynamic popularity threshold.

These features are neither taught nor suggested by Jungck or Sim.
Although Sim describes splitting a large file into multiple parts, he does not teach
or in any way suggest selective replication of only some of those parts (a portion
of a requested object) based on popularity or on anything else. In Sim either a file
is replicated (all of its parts) or not.

The Examiner relies on Sim, paragraph 230, to supposedly teach
"replicating the requested object in accordance with a dynamic replication
threshold" (Office Action, §27, rejection of claims 13, 19, 35, 41, 56 & 61).
However, that portion of Sim has no teaching or suggestion of any dynamic
replication threshold. In relevant part, *Sim* ¶0230 states:

> [0230] ...The Storage Management Subsystem watches
> the available shared storage, the content provider's reserved
> storage, and the usage logs. It initiates the removal of less
> popular content to make room for more popular and new
> content when available storage is running low. It does this by
> instructing the DS to remove some of their associated blocks
> that are least likely to be used. It accesses the File Metadata
> Database to determine how many and which blocks it will
> request to be deleted.

All that Sim says is that "less popular" content is removed to make room
for "more popular and new content." However, there is no mention or suggestion

of any "dynamic measure of popularity" or of any "dynamic popularity threshold" used to make any of the decisions. (As noted in the application, "a fixed threshold does not capture ... [the] dynamic nature of popularity." ¶0041. See also ¶0042-43.)

Thus, notwithstanding the impropriety of combining Sim with Jungck, this combination fails to teach using a dynamic measure of popularity of content in combination with <u>a dynamic popularity threshold</u>, and therefore fails to teach each limitation of any independent claim. In addition, any proposed combination of Sim with Jungck would lack the claimed "conditionally replicating <u>a portion of</u> the requested object on the particular edge server site <u>for use in serving future client requests</u>," as recited in claim 1.

For at least these reasons, claim 1 and its dependents are patentable over Jungck in view of Sim.

Similar arguments apply to the other claims.

For example, independent claim 16 recites "conditionally *replicating a portion* of the requested object to the edge server site from a parent server site in the network, said replicating being based at least in part on a *dynamic measure of popularity* of the requested object relative to *a dynamic popularity threshold*." Independent claim 23 recites "conditionally *replicating a portion of the requested object* on the particular edge server site *for use in serving future client requests*, said replicating being based at least in part on a dynamic measure of popularity of the requested object, wherein the portion of the requested object is replicated on the particular edge server site *when the dynamic measure of popularity of the requested object exceeds a dynamic popularity threshold*." And independent claim 38 recites "conditionally *replicating a portion of the requested object* to the edge server site from a parent server site in the network, said replicating being based at least in part on *a dynamic measure of popularity* of the requested object *relative to a dynamic popularity threshold*." Independent claim 45 recites "*a*

portion of the requested object is conditionally replicated on the edge server site
for use in serving future client requests, said replicating being based at least in part
on *a dynamic measure of popularity* of the requested object relative to *a dynamic
popularity threshold*."

Secondly, and with regard to all claims, the Office Action fails to set forth
any objective evidence supporting the contention that the combination of Sim and
Jungck is proper and, therefore fails to support a *prima facie* case of obviousness.
In Re Fine, 837 F.2d 1071, 1074 (Fed.Cir.1988). In *Graham v John Deere Co. of
Kansas City*, 383 U.S. 1 (1966), the Supreme Court specifically provided factual
inquiries to accomplish such an objective analysis. *KSR International Co. v
Teleflex Inc.*, 550 U.S. 398, 406 (2007). These inquiries are summarized below:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at
   issue.
3. Resolving the level of ordinary skill in the pertinent art.

As in most cases, the outstanding obviousness rejection involves the
combination of multiple prior art references, i.e., Sim and Jungck, since the Office
concedes that Jungck fails to disclose "if the edge server site does not have the
requested object, conditionally replicating the requested object to the edge server
site from the parent server site in the network, said replicating being based at least
in part on a dynamically measure of popularity of the requested object." *Office
Action,* at Page 6. As such, these *Graham* factual inquiries relate to an analysis
concerning the motivation or desire to combine prior art references to purportedly
render the claims obvious. The rationale for such motivations is therefore
particularly relevant and therefore reproduced below:

> "It would have been obvious to one in [sic] the ordinary
> skill in the art at the time the invention was made to have
> incorporated to replicate an object at the edge server based on
> its popularity as disclosed by Sim in a method for managed
> object replication and delivery as disclosed by Jungck **in order**

> **to make the delivery system more scalable resulting in lower traffic load on the network and providing most relevant & popular content to the requester more quickly making the system more robust and efficient."**

Office Action, pg. 6 (emphasis added). The Office Action does not explain how the purported motivation (highlighted above) applies to suggest to one of skill in the art to modify Jungck to include popularity measuring, regardless of the type taught by Sim (i.e., using *static* popularity determinations) or recited in the claims of the present invention (i.e., using *dynamic* popularity determinations). Nor does the Office Action explain how the purported motivation applies to suggest to one of skill in the art to modify Jungck to include "if the edge server site does not have the requested object, conditionally replicating the requested object to the edge server site from the parent server site in the network, said replicating being based at least in part on a dynamically measure of popularity of the requested object," when, as claimed, the object is served from a server site other than the edge server site. Because the solution set forth in Jungck is a complete solution in and of itself, one of skill in the art would not be motivated to go look for other solutions. There is no suggestion in Jungck that its solution is incomplete. There is no suggestion in Sim that *advance* popularity determinations should be used in Jungck's system.

Furthermore, the Office Action does not provide for any objective evidence for the motivation stated, regardless of whether that motivation could emulate from the specified references themselves or rather inferred from one of skill in the art. In its recent decision in *KSR* (cited above), the Supreme Court advised against such improper and unsupported rationale. In quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), the Supreme stated that "'[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some **rational**

underpinning to support the legal conclusion of obviousness.'" KSR, 550 U.S. at 418 (emphasis added).

While KSR arguably loosened the requirements for the Office to find obviousness, it did not given the Office a blank check to make up rationale for combining or modifying references, but instead promulgated guidelines for conducting what the Supreme Court intends to be an objective analysis of factual inquiries – the key words being **objective** and **factual**, not subjective and conclusory. Based on these guidelines, the MPEP even specifically enumerates the following exemplary rationales that "may" support a prima facie case of obviousness in the context of an Office Action.

> (A) Combining prior art elements according to known methods to yield **predictable results**;
>
> (B) Simple substitution of one known element for another to obtain **predictable results**;
>
> (C) Use of known technique **to improve** similar devices (methods, or products) in the same way;
>
> (D) Applying a known technique to a known device (method, or product) ready for improvement to yield **predictable results**;
>
> (E) "Obvious to try" – choosing from a finite number of identified, **predictable solutions**, with a reasonable expectation of success;
>
> (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are **predictable** to one of ordinary skill in the art;
>
> (G) **Some teaching, suggestion, or motivation in the prior art** that would have led one of ordinary skill

> to modify the prior art reference or to combine
> prior art reference teachings to arrive at the claimed
> invention. (emphasis added)

The Office Action summarily provides alleged motivation and predictability to support the combination of Jungck and Sim without specifically enumerating objective <u>evidence</u>. With regard to rationales A, B, D, E, and F (listed above), there is no objective evidence of predictability. The purported statement of predictability – therefore achieving user friendly functionality - is simply an assertion without any further elaboration or evidence.

With regard to rationales C and G (listed above), the Examiner's "in order to …" statement does not specifically address the missing link of Jungck purportedly provided in Sim – how would simply improving the likelihood of delivering more popular content suggest to one of skill in the art to employ a scheme as specific as a popularity measuring scheme? In the absence of any objective evidence, to make the mental leap from merely stating an advantage (to make the delivery system more scalable resulting in lower traffic load on the network and providing most relevant & popular content to the requester more quickly making the system more robust and efficient) to suggesting a specific method to accomplish such advantage could only be gleaned from subjective rationale based on hindsight. Accordingly, regardless of the proprietary of the purported motivation, which Applicant neither admits nor denies, this motivation in and of itself is irrelevant to the ultimate question that must be asked to satisfy a *prima facie* case of obviousness in this case.

In view of the above, withdrawal of this rejection under §103 is respectfully requested.

New claims 71, 74, 76, 78, and 80 relate to a system where the measure of popularity of an object is based on local and/or external information (*e.g.*, form other servers in the system). This feature is neither taught nor suggested by Jungck or Sim.

New claims 72-73, 75, 77, 79, and 81 relate to "chunking" an object and then to selectively replicating only a portion of the object. This feature is neither taught nor suggested by Jungck or Sim. Although Sim describes splitting a large file into multiple parts, he does not teach or in any way suggest selective replication of only some of those parts based on popularity or on anything else. In Sim either a file is replicated (all of its parts) or not.

U.S. Patent No. 6,859,840 B2 to Singal *et al*, cited by the Applicant, discloses prefix caching for media objects. In Singal, "a media object is … divided into a beginning portion (prefix), and a remaining portion (suffix). A prefix can be stored (cached) on an edge server and streamed to a user while the suffix is being fetched from an origin server." *Singal*, col. 4, lines 26 et seq. Note that Singal keeps the prefix on the edge server and "replicates" the suffix to that same edge server when the object is being served from that edge server. Signal bases the size of the prefix "on anticipated demand and service level agreements." *Singal*, col. 5, line 66 to col. 6, line 2. In Singal, "[i]f a hit occurs for media object having a prefix stored at the edge server, streaming can begin upon demand, while the suffix is fetched in parallel (pipelined) from the origin server 104 and cached at the edge server 114. This reduces the a priori storage space requirements while eliminating latencies of initial access. When cache is recycled, prefixes are retained." *Id.* col. 6, lines 2 *et seq*.

Sen et al (cited herewith) also discloses "a prefix caching technique whereby a proxy stores the initial frames of popular clips." *Sen*, Abstract.

As in Singal, Sen uses the prefix to start transmission in response to a request, and then gets the rest of the frames. ("Upon receiving a request for the stream, the proxy initiates transmission to the client and simultaneously requests the remaining frames from the server." *Id.*)

However, Singal does not teach or in any way suggest the invention as claimed.

Neither Singal nor Sen teach or in any way suggest replicating a portion of a popular object on a server site other than the one doing the serving.

Nor do Singal or Sen teach or in any way suggest conditionally replicating objects after the objects have been requested.

CONCLUSION AND REQUEST FOR PERSONAL INTERVIEW

Applicant respectfully submits that the inventions recited in the pending claims are not obvious in view of the cited references and that this application is in condition for allowance. An early action to that effect is earnestly solicited.

The Examiner is again kindly requested to contact the undersigned at the number provided to schedule a personal interview to resolve any outstanding issues in this case.

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0040.**	
The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (<u>missing or insufficiencies only</u>) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/ Order Nos. shown above, for which purpose a <u>duplicate</u> copy of this sheet is attached.	
This CHARGE STATEMENT <u>does not authorize</u> charge of the <u>issue fee</u> until/unless an issue fee transmittal sheet is filed.	
CUSTOMER NUMBER **83579**	Respectfully submitted, By: <u>/Brian Siritzky/37497</u> Brian Siritzky, Ph.D., Reg. No. 37497
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